Digital Government Authority
هـيـئـة الحكومة الرقـمـيـة

# Guideline for Free and Open-Source Software Adoption

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# Contents

# 1. Introduction

Based on the decision of the Council of Ministers No (14), dated 02/01/1443 AH, approving the rules regulating free and open source government software, and with reference to the Digital Government Authority's responsibility for establishing a repository where government agencies can deposit their software source code.

Recognizing the significance of fostering a local environment for free and open source software (FOSS) and elevating efficiency levels in information technology expenditures, the Authority has formulated the "FOSS Adoption Guideline" as mandated.

The primary objective of this Guideline is to offer direction and information to support government agencies in their adoption of FOSS, promoting software reuse, and ensuring the availability of source code to all government agencies. This initiative aims to standardize software selection criteria, enhance integration and collaboration among government agencies, and facilitate the integration of software from diverse sources.

If any information provided in this Guideline contradicts established laws, regulations, or protocols, the provisions outlined in such laws, regulations, or protocols shall take precedence.

# 2. Objectives

The Guideline's main objective is to guide government in the adoption of FOSS by :

- Defining the technical rules for FOSS reference architecture model & practices
- Providing a unified reference for government agencies to access reusable and applicable software
- Outlining the selection process for FOSS based on the classification provided herein.

# 3. Scope

The Guideline encompasses the following aspects For adopting FOSS products:

- Software and its various categories.
- Types of FOSS licenses and supporting models.
- FOSS Products and services.
- Requirements for adopting FOSS.
- Capabilities necessary for adopting FOSS.
- Guiding principles for FOSS.
- Identify the Steps involved in selecting FOSS products.
- Indexing guide for FOSS products catalog .
- FOSS product card.
- Methodology for adopting FOSS.

# 4. Target Audience

This Guideline applies to government agencies, experts, practitioners, and technical personnel involved in system and software development within government agencies, excluding military and security agencies which are subject to special terms, adhering to it's own regulations or by-laws.

# 5. Guide Statement

## 5.1 Types of Software

Software refers to a set of commands and instructions that have been developed to implement specific functions on a computer or on smart devices. Software has categorized into multiple types:

### 5.1.1 Software Categories:

1. Commercial Software: Software that is developed and sold by a company or individual with the aim of generating financial profit. It comes with technical support from the software supplier and the possibility of reselling it

2. Proprietary Software: Software distributed under a license that restricts users from distributing, modifying, or utilizing it for purposes other than those explicitly specified in the license. Such software is privately owned by the company or developer holding the copyright and distribution rights, and users are prohibited from accessing the program's source code.

3. Trial Software: Software utilized under trial licenses by developers and users for a specified period or with limited features.

4. Freeware: refers to software binary being distributed with licenses for free usage to by users and developers with any support by the developer or vendor.

5. Free Software: refers to open source software distributed with license to end users and developers with the following rights:

- The freedom to run the software anywhere and for any purpose
- The freedom to review, change, and modify the source code for any purpose
- The freedom to re-distribute copies of the open source software
- The freedom to distribute copies of modified and changed versions of the open source code to others

6. Open Source Software (OSS): Software that can be modified and is used by developers for the purpose of creating a solution or developing an application, provided that it adheres to the licensing model and types of licenses for free and open source software.

## 5.2 Types of FOSS Licenses and Supporting Models

Free and open source software (FOSS) is computer software with source code available to the public for use in its original form or with modifications, and usually does not require payment of licensing fees.

### 5.2.1 Most Common Types of FOSS Licenses:

- Massachusetts Institute of Technology (MIT) License
- Apache License (AL)
- 3-Clause BSD License
- 2-Clause BSD License
- GNU General Public License (GPL)
- GNU Lesser General Public License (LGPL)
- GNU Affero General Public License (AGPL)
- Mozilla Public License (MPL)
- Common Development and Distribution License (CDDL)
- Eclipse Public License (EPL)

### 5.2.2 FOSS Supporting Models:

Free and open source software can be distributed as binary files (a package that includes executable source code, a license file, and documentation) or distributed directly as source code (public repositories like http://github.com). Support for FOSS is typically provided by core developers, and as the community expands, the level of support improves. There are also software vendors that provide paid support for OSS. There are two main licensing models:

1. Dual Licensing Model: This model includes two licenses for the same FOSS product:

a. FOSS Community License.

b. Commercial License from FOSS Vendor.

2. Commercial Licensing Model: This model includes a single commercial license from a FOSS vendor.

## 5.3 FOSS Products and Services

Software used in designing and developing digital services, encompassing a wide range of tools and technologies that aid in the creation and development of such services. Such services and products are classified into five categories:

- Communication (Code 1)
- ICT Software (Code 2)
- Cloud Computing (Code 3)
- IT Services (Code 4)
- Advanced Techs (Code 5)
- This Guideline focuses on the following categories:
- ICT Software (Code 2)
- Cloud Computing (Code 3) (DGA-3)
- Advanced Techs (Code 5) (DGA-5)

Categories of FOSS products and services are divided into three levels:

- Level 01, the highest level.
- Level 02, a subcategory of Level 01.
- Level 03, includes specific products and services within Level 02 categories.

Classification of FOSS categories relies on a classification code composed of three numbers, "DGA-(L1). (L2).(L3)". The following table defines such categories:

| DGA Code | Level 01 | Level 02 | Level 03 | Definition |
|---|---|---|---|---|
| DGA-2.1.1 | ICT Software | End-User Office Software | Microsoft Office Software | Applications which are part of the Microsoft Office suite |
| DGA-2.1.2 | ICT Software | End-User Office Software | Multimedia/Graphics Software | Software focused on multimedia and image editing |
| DGA-2.1.3 | ICT Software | End-User Office Software | Programming and Development | Software focused on programming, including compilators and libraries |
| DGA-2.1.4 | ICT Software | End-User Office Software | Other Commercial Off-the-Shelf Software | Other commercial off-the-shelf software, readily available for deployment in workstations |
| DGA-2.1.5 | ICT Software | End-User Office Software | Specialized Software | Software which is deployed in specific sectors or that cover specific functionalities |
| DGA-2.2.1 | ICT Software | Middleware | Integration and Coordination | Software whose objective is to provide integration between the application and operating layers of systems |
| DGA-2.2.2 | ICT Software | Middleware | Web Servers | Software responsible for processing a client computer request and delivering web pages or other content |
| DGA-2.2.3 | ICT Software | Middleware | Database | Software functionality that allows accessibility to database management systems |
| DGA-2.2.4 | ICT Software | Middleware | Low-Code Development Platform | Software that allows development of programs through a graphical user interface (instead of traditional programming) |

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|---|---|---|---|---|
| DGA-2.2.5 | ICT Software | Middleware | Other Middleware | Other types of middleware enabling integration between client and server |
| DGA-2.3.1 | ICT Software | System Software | Operating Systems | Operating systems for different platforms and devices |
| DGA-2.3.2 | ICT Software | System Software | System Drivers | Operating software for different types of devices to ensure their proper functionality and compatibility within the overall system. |
| DGA-2.3.3 | ICT Software | System Software | Virtual Simulation | Virtual simulation software allows for the emulation of devices or software functions and creates a virtual system that supports the simulation. |
| DGA-2.3.4 | ICT Software | System Software | Security Software | Security software designed to enhance the security of computers and networks. |
| DGA-2.3.5 | ICT Software | System Software | Network Software | Applications deployed on network level to control and monitor the network environment |
| DGA-2.3.6 | ICT Software | System Software | Other System Software | Other system software not listed in the categories before |
| DGA-2.4.1 | ICT Software | Enterprise Systems | Institutional Planning and Development | Software that manages information that affects the corporate performance and human resources |
| DGA-2.4.2 | ICT Software | Enterprise Systems | Business Management | Software that manages the key business processes |
| DGA-2.4.3 | ICT Software | Enterprise Systems | Supply Chain Management | Software that manages the end-to-end procurement processes including project tendering & awarding, to supply-chain execution |
| DGA-2.4.4 | ICT Software | Enterprise Systems | Business Analysis & Reporting | Software that reports management information and strategic analytics |
| DGA-2.4.5 | ICT Software | Enterprise Systems | Content and Office Automation | Software that handles documentation, production, maintenance, presentation and disposal of electronic content as well as automation of standard business. |
| DGA-2.4.6 | ICT Software | Enterprise Systems | Information Technology Management | Software that manages efficient use of IT resources in the government entity |

| | | | | |
|---|---|---|---|---|
| DGA-2.4.7 | ICT Software | Enterprise Systems | General Administration and Organization | Software that manages and administrates official information such as assets, documents, records and office resources. |
| DGA-2.4.8 | ICT Software | Enterprise Systems | Financial Management | Software that manages the finances from budgeting and payment to monetary collection |
| DGA-2.4.9 | ICT Software | Enterprise Systems | Construction Management | Software that manages the various building components including physical security. |
| DGA-2.4.10 | ICT Software | Enterprise Systems | Communication and Collaboration | Software that manages the internal communication, collaboration and knowledge sharing among government staff within the government |
| DGA-2.4.11 | ICT Software | Enterprise Systems | Public Relations Management | Publication of official information to the public, including official public interaction and communication |
| DGA-2.4.12 | ICT Software | Enterprise Systems | Learning and Training | Software applications aimed at providing learning and training platforms in a corporate level |
| DGA-2.4.13 | ICT Software | Enterprise Systems | Geographic Information System (GIS) | Software that supports management, analysis, presentation, capture and storage of geographical data |
| DGA-2.4.14 | ICT Software | Enterprise Systems | Other Enterprise Systems | All other enterprise systems which do not fall in one of the categories described above |
| DGA-2.4.15 | ICT Software | Enterprise Systems | Specialized Enterprise Software | Enterprise software dedicated to a specific area of business, implemented in the entity level |
| DGA-2.5.1 | ICT Software | Customizatio n and Development | Software customization services | Professional services related to the customization of software |
| DGA-2.5.2 | ICT Software | Customizatio n and Development | Software development services | Professional services related to the development from scratch of specific Software not available as COTS solution |
| DGA-2.5.3 | ICT Software | Customizatio n and Development | Mobile Application Development: | Development and customization of specific mobile software for corporate usage |

| | | | | |
|---|---|---|---|---|
| DGA-3.1.1 | Cloud Computing | Software as a Service (SaaS) | - | All applications running in a cloud infrastructure made available by a cloud provider and accessible through the network under any deployment mode (Public Cloud, Private Cloud, Hybrid Cloud) |
| DGA-3.2.1 | Cloud Computing | Platform as a Service (PaaS) | - | All platforms (user-created or acquired) running in a cloud infrastructure which user can manage through the network under any deployment mode (Public Cloud, Private Cloud, Hybrid Cloud) |
| DGA-3.3.1 | Cloud Computing | Infrastructure as a Service (IaaS) | - | All fundamental computing services (processing, storage, networks, etc.) running in a cloud infrastructure and accessible through the network under any deployment mode (Public Cloud, Private Cloud, Hybrid Cloud) |
| DGA-3.4.1 | Cloud Computing | Cloud Computing Support Services | Managed Cloud Services | Services provided by a cloud vendor to manage the whole cloud infrastructure of an entity |
| DGA-3.4.2 | Cloud Computing | Cloud Computing Support Services | Cloud Transfer | Services provided by a cloud vendor to support migration of traditional IT infrastructure to a cloud environment |
| DGA-3.4.3 | Cloud Computing | Cloud Computing Support Services | Cloud Services Implementation and Support | Services provided by a cloud vendor to that offer support to implement certain cloud solutions for the entity |
| DGA-3.4.4 | Cloud Computing | Cloud Computing Support Services | Other Cloud Consulting Services | Services provided by a consulting firm other than the ones described above, usually less technical |
| DGA-3.4.5 | Cloud Computing | Cloud Computing Support Services | Other Cloud Services | Other Cloud Computing services apart from SaaS, PaaS or IaaS |
| DGA-5.1.1 | Advanced Technologies | Augmented Reality and Virtual Reality | - | Services and products related to AR/VR Platforms technologies |
| DGA-5.2.1 | Advanced Technologies | Android Devices | - | Services and products related to Robotics implementation |
| DGA-5.3.1 | Advanced Technologies | Artificial intelligence (AI) | - | Services and products related to Artificial Intelligence technologies |
| DGA-5.4.1 | Advanced Technologies | Internet of Things (IoT) | - | Services and products related to IoT Platforms technologies |

| | | | | |
|---|---|---|---|---|
| DGA-5.5.1 | Advanced Technologies | Distributed Ledger Technology | - | Services and products related to Distributed Ledger Platforms technologies |
| DGA-5.6.1 | Advanced Technologies | Drones | - | Services and products related to Drone technologies |
| DGA-5.7.1 | Advanced Technologies | Big Data | - | Services and products related to Big Data Platforms technologies |
| DGA-5.8.1 | Advanced Technologies | 3D Printing | - | Services and products related to 3D printing technologies |
| DGA-5.9.1 | Advanced Technologies | Other | - | All other advanced technologies that do not fit in the classification above |

Table 1 - Definitions of DGA Program Classification Levels

## 5.4 Requirements for Adopting FOSS

These requirements are intended to promote the adoption of free and open source software by government agencies , and consist of:

1. Regulations and legislation pertaining to the adoption of free and open source software, including relevant policies of government agencies.
2. Implementation of FOSS reference architecture practices, including the following:

- The software development life cycle (Fig. 1) and its component's that help define FOSS products.
- Adherence to used FOSS framework methodologies, standards, and related government guidelines for open source software.
- Reprogramming using open source software best practices to shift from commercial software to free and open source software.
- Using of new frameworks to design and implement digital government platforms or services based on modern microservices architecture and DevOps tools.
- Platform as a Service (PaaS) refers to services that provide specific platforms enabling users to develop, operate, and manage applications without the complexity of building and maintaining the underlying infrastructure usually required in application development and launch.

3. Integration Platform and Application Programming Integration (API) provides a single, unified API entry point across multiple internal APIs, layer rate limiting, security and privacy, and perform capabilities such as analytics, monetization, and life-cycle management. All government services are then elevated to the same level of security, scaling and serviceability
4. Open Source Reference Architecture contains initial business development models and patterns that can be reused in the design and implementation of various digital technologies, solutions, applications, and platforms , and aims to :

- The architecture should be a generic solution that is vendor neutral.
- The architecture should be capable of being instantiated to produce intermediary open-source architectures for different types of technology / digital projects.
- Enable alignment between business and technology.
- Ensure compliance with the steps for selecting free and open source software.
- Provide a model for identifying constraints and directions for free and open source software implementations.
- Users of the reference architecture should be able to specify how to create a new copy identical to the reference architecture.
- Reference architecture should use as few technical layers as possible to describe different groups and elements.

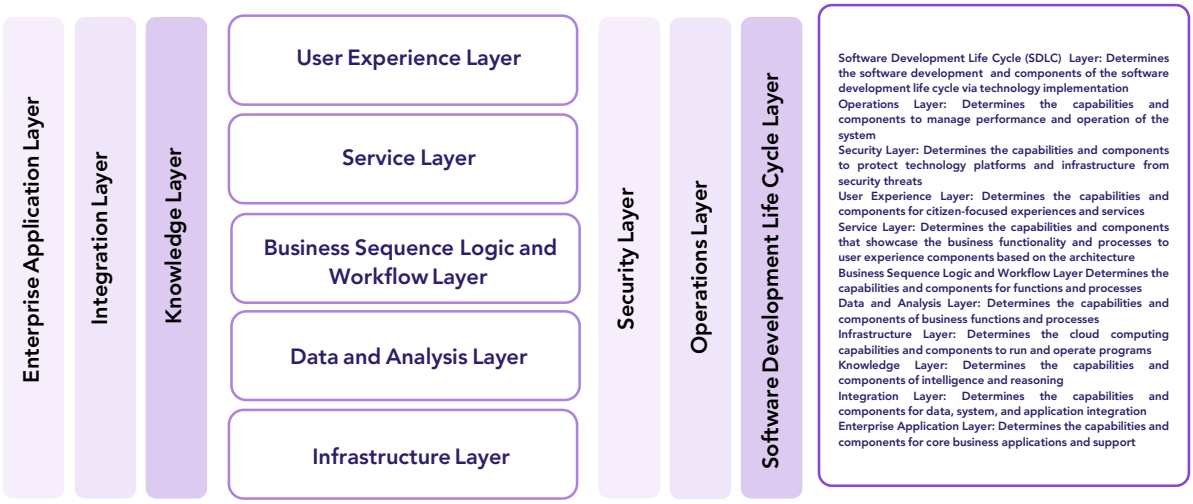


Figure (1): Open Source Reference Architecture

## 5.5 Enablers for Adopting FOSS

There are six main enablers for adopting free and open source software:

1. Architecture for a Product/Platform/Frameworks/Libraries/Software Tools or Technical Solution utilizing free and open-source software products across different technology layers.
2. Free and open source software products that can be integrated into the technical design architecture.
3. Detailed information on free and open-source software products for further evaluation.
4. Steps for selecting suitable free and open-source software products and the evaluation criteria used to assess their viability and reusability.
5. Design considerations for software systems from the perspective of free and open-source software.
6. Reference architecture model for classes and common elements of free and open-source software.

## 5.6 Principles for FOSS

There are 3 guiding principles for FOSS, outlined as follows:

1. Involvement of the community in knowledge sharing and participation in future implementation. Adoption of Agile development methodologies as an alternative to traditional software methodologies is a best practice.
2. Supervision, implementation, and adherence to recommendations for free and open-source software by government agencies
3. Quality testing of free and open-sources' codes through the Free and Open Source Government Software Repository Platform (oss.dga.gov.sa).

## 5.7 Steps for Selecting FOSS products

Steps for selecting free and open-source software products to deliver appropriate products to government agencies according to the following criteria:

| Steps for FOSS products | Definition | Source |
|---|---|---|
| **Community or supplier support** | Community or suppliers supporting FOSS products | Website of community or suppliers selected |
| **Safety Indicators** | Rate of security compliance and controls in a specific FOSS Product | Black Duck Openhub<br>https://www.openhub.net/ |
| **Benchmarking for Adoption** | List of key benchmarks illustrating the use of FOSS Product | www.github.com<br>(review the no. of authors/developers for the product in the last 30 days to understand the product) |
| **Date of First Release** | It shows the date of the first release of FOSS Product. | Product website or www.github.com (product versions) |
| **Date of Last Stable Release** | It refers to the final release of FOSS Product | Product website or www.github.com (product versions) |
| **Government Accreditation** | It explains the various government agencies that have accredited the use of FOSS Product | Many government websites in various global, leading countries that are concerned with adopting free and open source software |
| **Expanding Use of Cloud Computing** | It indicates whether or not FOSS Product is hosted on a public cloud computing platform and is used for large-scale implementations (such as Amazon Web Services, Azure, and Google) | Cloud Computing Service Providers include:<br>Amazon Web Services<br>https://aws.amazon.com/marketplace<br>Azure:<br>https://azuremarketplace.microsoft.com/en-us/marketplace/<br>Google Cloud Platform<br>https://cloud.google.com/marketplace |
| **Availability of Documentation** | It shows the availability of documentation or guides for specific FOSS Product | Website of the to-be selected product |

Table 2 - Steps for Selecting FOSS Products

1. Determine the steps for evaluating free and open-source software
2. Conduct research on free and open-source software products
3. Collect information through the defined steps
4. Calculate an index for free and open-source software products
5. Choose the desired free and open-source software products
6. Select the product profile

Fig. (2) illustrates the steps for researching FOSS products and approaches for product selection.

FOSS Product Index is used to assign scores to score the top five specific free and open-source software products, in order to select the two most suitable products that receive the highest scores and are appropriate for government agencies in the Kingdom. Table 3 presents FOSS Product selection index based on the steps defined for FOSS Product selection.

| FOSS Product Selection Index | Scoring Steps for FOSS Product Selection Index |
|---|---|
| **Community or Supplier Support** | Evaluation Score 1: Product support is offered by FOSS provider |
| | Evaluation Score 0: Product support is offered by free and open-source software community |
| **Safety Indicators** | Evaluation Score 1: FOSS Product Security Index equal to or greater than 80%. |
| | Evaluation Score 0: FOSS Product Security Index equal to or less than 80%. |
| **Benchmarking for Adoption** | Evaluation Score 1: 10 or more authors/developers have contributed new code to FOSS Product in the last 30 days. |
| | Evaluation Score 0: Fewer than 10 authors/developers have contributed new code to FOSS Product in the last 30 days. |
| **Launch Date** | Evaluation Score 1: FOSS Product was released more than 3 years ago. |
| | Evaluation Score 0: FOSS Product was released less than 3 years ago. |
| **Date of Last Stable Release** | Evaluation Score 1: Two or more releases of FOSS Product in the last 12 months. |
| | Evaluation Score 0: One or none releases of FOSS Product in the last 12 months. |
| **Government Accreditation** | Evaluation Score 1: FOSS Product is employed by at least one government agency. |
| | Evaluation Score 0: FOSS Product is not used in any government agency. |
| **Expanding Use of Cloud Computing** | Evaluation Score 1: The free and open-source software product is available on one or more cloud computing service provider markets. |
| | Evaluation Score 0: FOSS Product is not available in Cloud Computing Service Market. |
| **Availability of Documentation** | Evaluation Score 1: FOSS product documentation is provided by the vendor or community. |
| | Evaluation Score 0: FOSS product documentation is not available. |

Table (3) - FOSS Products Selection Index 5.8 Indexing Guide for FOSS Products

## 5.8 Index Guide of FOSS Products

This section presents the Indexing Guide for FOSS products. This index defines three levels (L1), (L2), and (L3), from which the product scope is divided according to its classification and is referred to in the final product as the component (C). The index classification starts with the code for all DGA products, and is in the following format (DGA-(L1). (L2). (L3). (C)). The products are divided into the following categories:

### ICT Software

- End-User Office Software (DGA-2.1).
- Middleware (DGA-2.2)
- System Software (DGA-2.3)
- Enterprise Systems (DGA-2.4)
- Customization and Development (DGA-2.5)

### Cloud Computing

- Software as a service (SaaS) (DGA-3.1)
- Platform as a Service (PaaS) (DGA-3.2)
- Infrastructure as a service (IaaS) (DGA-3.3)

### Advanced Technologies

- Robotic Processes (DGA-5.2)
- Artificial Intelligence (AI) (DGA-5.3)
- Internet of Things (IoT) (DGA-5.4)
- Big Data (DGA-5.7)

## 5.9 FOSS Product Card

FOSS product card shows the collected information of the product and its framework. Table 4 shows the template used for FOSS product card.

| Product code | FOSS product classification code |
|---|---|
| **Reference architecture code** | FOSS reference architecture code |
| **Product/Framework** | Product/framework name |
| **Function** | A brief definition and description of the general function of the product and its main features |
| **Website** | Links to access information about the product |
| **License model** | License model available for the product |
| **License type** | Explanation of the license type based on the most popular license types for Open Source Software (OSS) |
| **Vendor support** | Names of vendors that offer commercial support for the product (if available) and the available support levels |
| **Community support** | Provision of links to community support channels |
| **Source code URL** | Provision of a URL to download the source code |
| **Development package** | Programming languages and frameworks |
| **Interoperability** | Information about integration and interaction capabilities to integrate the product with other OSS products |
| **Security** | Security features available for the products, such as: Encryption, access protocol, etc. |
| **Language support** | Information about support for Arabic and right-to-left languages |
| **FOSS classification** | Products as classified by FOSS Guide |

Table (4) - FOSS Product Profile

To obtain FOSS product cards, you can visit the digital platform for depositing government software at the following link:

https://oss.dga.gov.sa

## 5.10 Methodology for Adopting FOSS

Free Open-source software (FOSS) differs from commercial software and proprietary software in many aspects. Therefore, some changes in the nature of software development may be required to match the nature of FOSS work. Some of the most famous methodologies and global models in this regard are:

### InnerSource methodology

A methodology for teams to work together on code, where engineers build software within the ecosystem using FOSS practices and apply them to software that remains owned by one agency, or a small group of cooperating agencies

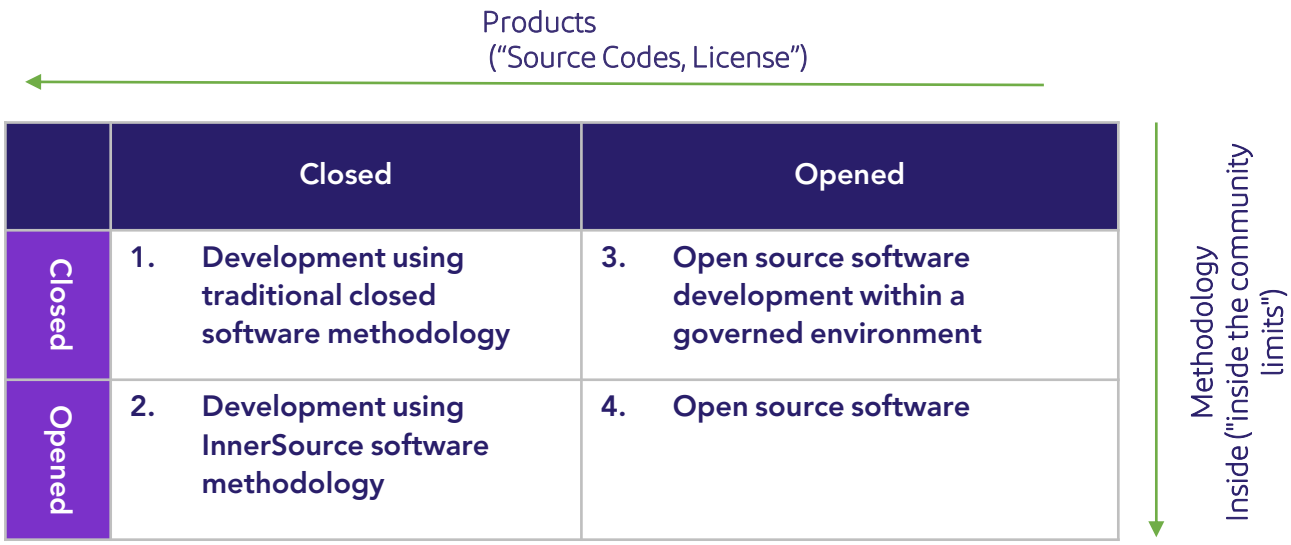


Figure (3) - InnerSource software model

### Objectives of Adopting InnerSource Methodology

- Reduce individual work.
- Create reusable software.
- Use distinctive skills.
- Innovation.
- Software maintenance and operation.

The InnerSource methodology encourages contribution and cooperation among all members of the development team. The team consists of supervisors, who initiate the project and approve modifications and improvement requests, and contributors, who add improvements and development to the software code.

### Steps for implementing the InnerSource methodology in government software

- Obtaining government OSS license.
- Creating a folder for codes on the government code repository.
- Identifying the type of code folder as internal or public for government agencies, and it can be changed to a public project once stages are completed (Figure 3).
- Adding a detailed profile for the codes that explains how to contribute.
- Identifying the code license (government license or one of the most common licenses).
- Ensuring the ability to receive proposals from outside the agency for new contributors.
- Clarifying the method of receiving and accepting proposals from contributors.
- Tracking the proposed requests from contributors and working on them.
- Publishing common questions and answers about the codes within the repository.

# 6. Table of Definitions

The following terminologies, whenever mentioned herein, shall have the meanings shown below unless the context shows otherwise:

| Term | Definition |
|---|---|
| Authority ("DGA") | Digital Government Authority |
| Digital Transformation | Digitally and strategically transforming and developing business standards and models that would rely on data, technologies, and ICT. |
| Free Open-Source Software (FOSS) | Software that can be freely used, copied, and shared. |
| Digital Government | Promotes administrative, organizational and operational processes between the various government entities in their transitioning to a comprehensive digital transformation to allow easy and effective access to government digital information and services. |
| Government Agencies | Ministries, authorities, public institutions, councils, national centers including any additional form of a public entity. |
| Software License | A software license defines the terms and conditions under which a software can be used, and released under a license that has been proven to meet the criteria of the open source definition. |
| Software License Model | The software license model refers to the entity responsible for developing and supporting OSS. This can be a community, a vendor, or a company affiliated with a OSS community. |
| Software License Type | The software license type refers to name of Open Source Software (OSS) license that is compatible with Open Source definition. This license specifies rights and restrictions for using OSS, including GNU General Public License (GPL), Mozilla Public License (MPL), and other licenses. |
| FOSS Community | Users and developers of free and open source software. |
| Code Base | The code base is the collection of source code used to build a software application. |
| Code Fork | Code Fork is the process of creating a new product by forking the code base of an existing product and making modifications to sources to create new features and establish a new identity for the project. |
| Reference Architecture | A reference architecture defines a prototype and components at the level of known technology layers to direct the process of identifying technology products based on best practices in the ICT sector. |
| Cloud Computing | A model which enables convenient, on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. |
| Framework | A framework is a stable or foundational component that allows developers to choose to customize or override common code with general functionality. Unlike software libraries that are invoked using user code, frameworks drive the application design process and are responsible for invoking user code. |
| Tools | Tools are software that can be run, offline without a graphical user interface (GUI), to develop software elements or other documentation, or generate, test, analyze, or maintain code. |

| | |
|---|---|
| Libraries | Libraries are a collection of pre-written code that can be reused in other software programs. |
| Sandbox | Sandbox refers to an isolated testing environment that is typically used to try out and test code changes, and perform conclusive experiments in isolation from a production or repository environment. |
| Digital Platform | Technical solutions on which digital products and services are built and provide beneficiaries with an enhanced digital experience through digital portals or smart device applications. The digital platform allows these channels to connect and integrate. Further, it allows integration of its services with other external services. Such as Absher Platform. |
| Solution | A collection of products and services that are designed to meet a specific business need. The same can be built using a combination of platforms, products, and services provided by vendors or developed internally. |
| Application | A set or sequence of commands given to the computer to perform a specific task within a time frame. The same works on a desktop or mobile device. |
| OSS Products | A software product is a standalone solution that can meet functional needs through configuration changes, and open source products make the source code available for modification, while proprietary or commercial software products are closed source and do not share the source code. They are available only in binary format. |
| Digital Service | A set of transactions linked to each other to perform a complete function provided by the government entity to the beneficiary through digital channels such as digital portals and smart device applications so that they have one main exit defined and specified. A group of services can be linked together to form a digital product. |
| Microservices | Microservices are a popular architectural style for creating applications that are highly flexible, scalable, independently deployable, and quickly evolving. However, a successful microservices architecture requires a different approach to application design and development. |
| DevOps Approach | DevOps is a combination of theoretical and practical approaches and cultural tools that increase the ability of the agency to deliver applications and services at high speed; and develop and improve products at a pace faster than agencies that use traditional processes for developing software and managing infrastructure. This speed enables agencies to serve their beneficiaries better and increase their effectiveness in competing in the market. |
| Technical Layers | Technical layers are independent layers that define the common communication protocols between interface tools operated by hosts in a computer network. |
| Software Libraries | A collection of subroutines used to develop software. Libraries contain "helper" code and data that provide services to independent programs. This allows for sharing code and data in the form of separate units. |
| Software Tools | Software tools (also known as development tools) are a set of computer programs that are used by programmers or developers to build, create, process, and maintain software and applications. |
| Containers | A container is a software deployment process that bundles an application's code with all the files and libraries it needs to run on any infrastructure. |
| Software Market | A market for products and OSS that are provided directly through government and community cloud computing or are downloadable. |
| Open Sources | They refer to software or products that are distributed with their source code and are available and open to anyone to use and modify. |
| Platform as a Service (PaaS) | PaaS are services that provide specific platforms that enable users to develop, operate and manage applications without complicating the construction and maintenance of the basic infrastructure usually required for the development and launch of applications. |
| Source Codes | Orders and instructions written in one of the programming languages that make up any computer program. |

# 7. Table of Abbreviations

| Abbreviation | Meaning |
|---|---|
| **FX** | Response to events of any scale |
| **AGIP** | (Api Gateway Integration Platform) |
| **FOSS** | Free and Open-Source Software |
| **OSS** | Open-Source Software |
| **PaaS** | Platform as a service<br>PaaS |

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